DOCUMENT RESUME

ED 466 147 IR 021 217

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TITLE	Linking Organizational Knowledge and Learning.
PUB DATE	2001-06-00
NOTE	7p.; In: ED-MEDIA 2001 World Conference on Educational Multimedia, Hypermedia & Telecommunications. Proceedings (13th, Tampere, Finland, June 25-30, 2001); see IR 021 194.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Computer Uses in Education; Corporations; Educational Development; *Educational Technology; Foreign Countries; Higher Education; *Instructional Design; *Instructional Innovation; Organizational Development; Training; Universities
IDENTIFIERS	Netherlands

ABSTRACT

Universities and corporate training centers are under pressure to offer increasingly flexible, as well as individually relevant, learning. Instead of trying to develop a stream of Web-based courses to run parallel to "business as usual" courses, a department can focus on gradually building a knowledge base in which key resources from individuals in the department or organization, from external sources, produced by learners, or re-used from previous courses can all be available for reuse in various combinations and in different views for different learning situations including learners in varying locations. With a focus that changes from "distributing content" to "building and (re)using resources," a new way of thinking about "courses" occurs. These processes require good technology; agreement on locally relevant standards; simple procedures for adding, finding, managing, and reusing resources; and a change in mindset for all those involved. This paper describes how this is being done.(Author/AEF)

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Linking Organizational Knowledge and Learning

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Abstract: Universities and corporate training centers are under pressure to offer increasingly flexible as well as individually relevant learning. Instead of trying to develop a stream of Web-based courses to run parallel to "business as usual" courses, a department can focus on gradually building a knowledge base in which key resources from individuals in the department or organization, from external sources, produced by learners, or re-used from previous courses can all be available for re-use in various combinations and in different views for different learning situations including learners in varying locations. With a focus that changes from "distributing content" to "building and (re)using resources" a new way of thinking about "courses" occurs. These processes require good technology; agreement on locally relevant standards; simple procedures for adding, finding, managing, and re-using resources; and a change in mindset for all those involved. How we are doing this is described.

Types of Learning and Pressures for Change

Within organizations, four general types of learning can be identified, as shown in Fig.1:

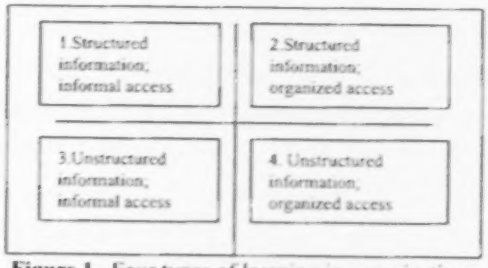
1.Structured information; informal access
2.Structured information; organized access
3.Unstructured information; informal access
4. Unstructured information; organized access

Figure 1. Four types of learning in organizations

In universities, Category 1 is typically represented by the library; in companies, by the knowledge management system in place in the organization. In both universities and companies, Category 2 is represented by courses, where learning materials are prepared or selected, and learner interaction with those materials is pre-determined by the course designer. Category 3 occurs for learners less often in universities, until learners are senior enough to have informal contact with those having knowledge and experience. For the professional staff in universities and companies, Category 3 learning occurs most frequently; on the job, via contacts with one's colleagues in house and outside or by casual contact with resources, such as via e-mail between colleagues or via borrowing a document one sees in a colleague's office when dropping in for a chat. Category 4 occurs in universities most often in a graduate or professional seminars; when the opportunity is created for a small group to share and discuss experiences with each other, led by a knowledgable leader who can relate those experiences to a broader concept or issue and stimulate reflection and transfer. In companies, such seminar-type learning situations may also be organized but they are usually not explicitly planned by the training department. The best examples of Category 4 in companies may be management-trainee seminars.

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Each of the categories in Table 1 has its strengths, but also its limitations. Traditionally those responsible for Category 1 in both universities and companies are not those responsible for Categories 2 and 4. No one is responsible for Category 3; it just happens. In universities, "courses" fall mostly in Category 2, until the graduate level, when Category 4 predominates. In company training departments, Category 2 predominates. Category 2 is most often translated as content delivery, with the participants on the receiving end of the transfer.

In this context, two pressures are being experienced. (a) The first is the case for both universities and company training: the pressure for more flexibility. Particularly for the Category 2 experiences, learners may differ in when, where, and how they can optimize their acquisition of this knowledge. In universities, this pressure has led to more and more "distance education" and in companies to "e-learning". In both cases, it is assumed that knowledge will be pre-organized and delivered; what needs to happen is to release the learner from the constraint of having to be in a certain room at a certain time for this to occur. A less-understood aspect of flexibility is the need of learners to identify what forms of prestructured learning experiences are best for them. (b) The second pressure relates to relevance. The need for university courses to be relevant in the future careers of the students is becoming sharper as more and more students are already established in those careers and have an immediate basis from which to judge relevance. In companies, the need to relate formal learning to issues of importance in the workplace is also clear. In companies, where courses tend to be short in duration and chosen on a somewhat individual basis, the relevance problem is seen to be solved by the "voting by their feet" method: learners will enroll in the course that they need. If portions of the course are not useful to them is not much considered. In a two- or three-day course (typical in companies), as long as something is learned, the time spent unnecessarily is usually not seen as a concern.

Relevance in company training is easier to establish than in university settings. Real problems and issues facing employees in the company exist, and can be used as the basis for training. This occurs, but often in an abstract way. Courses are often seen as transfer of facts and concepts, with the presumption that the learner will be able to apply those in his work. The strengths of Categories 1 and 3--enterprise-specific experience--appear to be rarely used as the basis of Category 2 learning events, particularly those "on the Web". This tendency is increasing due to the pressures for time- and distance-learning. To offer courses at a distance and at learner-determined times, courses are being "bought" from the cheapest (often external) source, the criteria are that the courses be "standards compliant" and put on the Web. Explicit use of in-house experience, particularly the experiences of the learners, is unlikely to occur in a course acquired externally. By offering some access to a "tutor" who can answer questions about the pre-determined course material, it is assumed that a good substitution for a face-to-face setting has occurred.

But there are problems with this "solution". How can all these courses be found? How long does it take to develop them? How can this occur while "business as usual" still goes on within the traditional university or company training center? Is the expertise of the in-house course leader and of the participants being exploited? Is the learning experience good enough? What is the return on the investment in the short and long term? Are any of the benefits of Categories 1, 3, and 4 being integrated into Category 3? And do the results of the learning that occurs in a Web-based Category 2 course become available for others in the organization?

In our experience, in both university and company settings, the answer to providing more flexibility in learning is generally interpreted as pertaining to Category 2, and is generally being answered by making or finding pre-structured, organizational-neutral courses available via the Web with little or none of the strengths involved with Categories 1, 3, and 4. Particularly in companies, the connection between "e-learning courses" (Category 2) and Categories 1 and 3 is almost non-existent, and Category 4 barely exists in the first place. In universities, Category 1 becomes peripheral, as in-house libraries can never offer so much as portals on the Web. Category 3, "informal learning from colleagues", is hoped to occur through some entries on a discussion board, and Category 4 is outside the range of instructional designers of Web-based courses.

In our approach, we want to turn these tendencies around. Flexibility in terms of time and distance is important, but not our first aim. Pre-structured content is important, but not our first aim. What is our first aim? Learning from experiences, from one's own and from those in one's organization, and building upon these experiences for all four different types of learning categories. With learning from experience as a guiding theme, the boudaries between the four cells in Figure 1 start to blur, and "distance education" and "e-learning" take on new forms. A course becomes a guided opportunity to learn from experience, and to contribute one's own experience as learning materials for others.

Key Points for Learning from Experience

There are several key differences in the "learning from experience" approach compared to the "learning from neutral content" approach. These are identified in Table 1.

Learning from content transfer	Learning from experiences
Content is preselected, prestructured, and delivered	Content is encountered from a variety of sources, and partially is contributed out of one's own experiences
Learning relates to hours of time spent on reading or listening or attending face-to-face sessions.	Learning relates to finding and interpreting examples from practice, seeing how they relate to important competencies and objectives, and contributing to the collective knowledge base.
The starting point of a course is its content, prepared by in advance by professionals, perhaps not even having any contact with the organization.	The starting point of a course is the activities that learners will do, in order to bring new resources into the learning setting.
To be time and distance independent, a course must be instructor independent; tutors need to be available to answer questions relating to the pre-defined study material. Perhaps a forum can be available if some wish to use it (must will not).	The good instructor should be extended over time and distance. His main task is to lead learners to making the connection between theory and practice, starting with their own practice. He is not replaced, but extended.
Content and standards determine quality.	Building on and contributing to the learning resources and learning community of the organization determines quality.
Standards are necessary to make use of materials produced elsewhere, and to sell your own materials elsewhere.	Standards are necessary but need to be a combination of external indexes and also locally meaningful indexes.
"Offering instructor-neutral courses on the Web" is the guiding theme.	Building on and using the experience base of the organization is the guiding theme of learning activities.
Learning is completing courses.	Learning is becoming an active member of a professional community, knowing how to locate appropriate knowledge (also in human form) and apply it in one's work.
Learning is studying pre-written content.	Peer-to-peer learning is central; pre-written content is a resource, but may also sometimes by written by one's peers.

How do these principles work in practice? They involve technology, pedagogy, and new ideas about instructional design (Collis & Moonen, 2001). "The only way to keep pace…is by rebuilding business processes to take advantage of the collective knowledge base" (Eckhouse, 1999). They involve the convergence of courses and professional development, of formal and informal learning. "The advantages in technology and changes in the organizational infrastructure have increased the significance of virtual knowledge sharing, knowledge refining, new knowledge building and virtual networked learning for professional development." (Vänskä 2001). "Potentially explicable knowledge that has not been articulated represents a lost opportunity to efficiently share and leverage that knowledge" (Zack, 1999). "People to people" connections (Hinrichs, Kelly, & Bakia, 2000) are critical. An "experience management" architecture (Layton, 1999) needs to replace a "course management system". Figure 2 shows such an architecture, based on an object-oriented database.

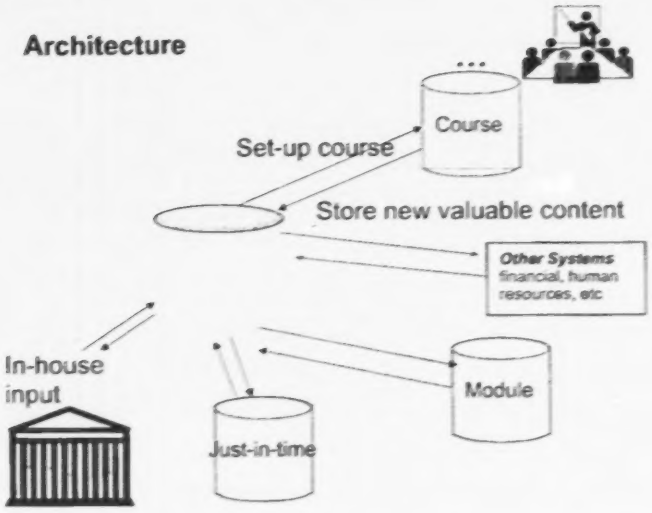

Figure 2. Building on experience. Use of an object-oriented database to both acquire new records of experience and also to offer different views and combinations of experiences for different learning settings. (De Boer, 2000).

Making it Happen

How does this happen in practice? We know, in that we have been working in this direction in our own institution, the University of Twente, for several years and also are implementing these ideas in various company settings. The following steps (Table 2) are the ones we have used; each is based on a considerable amount of literature and experience (see Collis & Moonen, 2001; see also http://teletop.edte.utwente.nl).

Table 2. From content delivery to building on experience

Steps	Strategies and tools
1. Start where instructors are at; extend their strongest skills so that learners who are not present can also take advantage of these skills.	1. Begin by extending an existing course, not "creating" or "buying" a "Web-based course"
2. Shift the focus from content to activities	2. Assume you can go on, for awhile at least, with the existing textbook or course reader; don't start by trying to put it "on line". Focus instead on new forms of activities that will bring new resources into the course.
3. Plan activities around learner contribution, and learner (re)use of resources contributed from a variety of sources	3. Use a Web system that makes upload and download of resources easy, for both instructor and learners. Uploaded resources need to become objects in a database, indexed or managed on the fly to make them immediately available for re-use.
4. Plan activities so that learners who are present in a face-to-face session create a base set of resources, which can be built upon by learners who are not present.	4. Use a Web system linked to a database; write activity descriptions that involve building upon the inputs of others; commenting, synthesizing, adding to, comparing to one's own ideas, etc.

Table continues

Table 2, continued

5. Gradually add more self-study content materials, but preferably based on the input of others in the organization.	5. Re-use good input, move toward an idea of a course site as a collection of resources, with the course focusing on structured use of and addition to those resources.
6. Make activities meaningful, and required.	6. Plan activities so that each participant's contribution is visible, valuable, and needed in order to continue with the learning activities. Activities are aimed at contributing to the learning resources, not individual practice exercises.
7. Assess via contributions	7. Assess the adequacy of course participation via what is submitted to the course Web environment. "Passing" a course is not a matter of only attending course sessions or completing an individual examination, but rather of showing one can relate to, build upon, and add to, learning-related resources.
8. Aim for contribution and flexibility, distance and time are not the key points.	8. With a contribution approach, learners can participate at locations of their choice and within certain time periods. The same learning resources can also be used for "just in time" and individual learning. Distance and time flexibility gradually and naturally increase.
9. Think of content as coming from a variety of sources.	9. Use the Web environment (based on a database) as a tool to bring together different views of a variety of content objects: those produced by professional instructional designers, those created by the instructor, those contributed by learners, and those documents found in house or on the Web which may not be created as "learning objects" at all.
10. Be less concerned about the "perfection" of the content objects and more concerned about the contribution and re-use processes	10.. Be very careful about how activities are described, about what is expected in sub-tasks, about how to monitor progress, about how to bring in peer interaction, about how to evaluate and determine completion. Re-use model contributions.

Figure 2 shows how the building process of a course can occur as the course progresses, with on-going input from both the instructor and other participants. In this approach, the course environment grows with each learner.

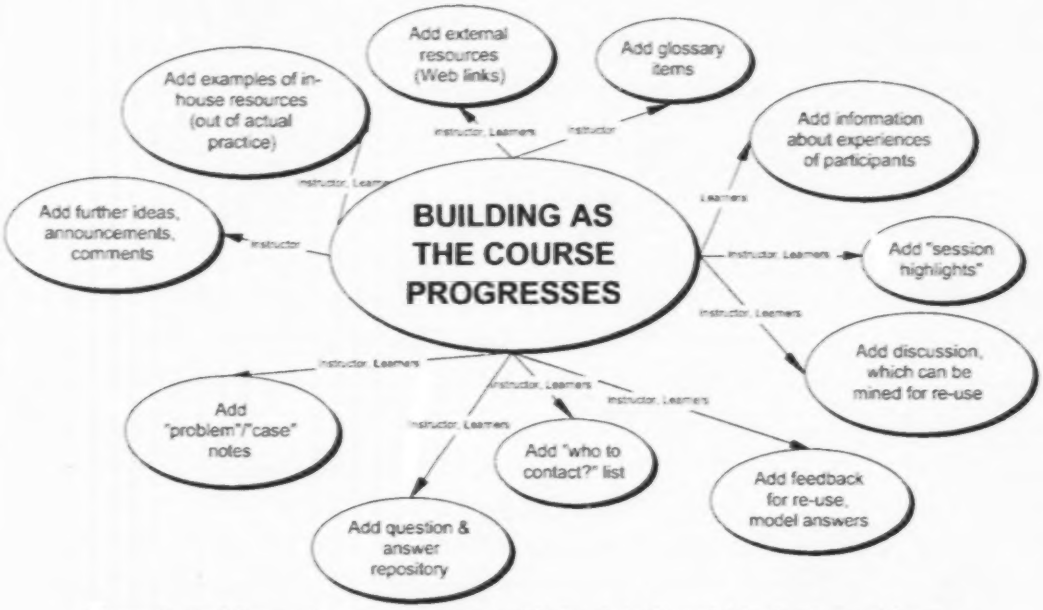
BUILDING AS THE COURSE PROGRESSES
Add external resources (Web links)
Add glossary items
Add examples of in-house resources (out of actual practice)
Add information about experiences of participants
Add further ideas, announcements, comments
Add "session highlights"
Add discussion, which can be mined for re-use
Add "problem"/"case" notes
Add "who to contact?" list
Add feedback for re-use, model answers
Add question & answer repository
Instructor, Learners
Instructor
Learners

Figure 2. Building as the course progresses. The key is in the activities for the participants.

And the Technology?

What is needed for this approach? The technology is a main and indispensible factor. A system built upon an object-oriented database that offers flexibility in terms of the templates that can be developed to support input and output from the database is critical.. Tools for easy download and upload, in page designs of the instructor's choice, are necessary. An easy-to-use method to index, find, and re-use contributions and resources from a variety of sources, and to present these via different views generated by the database is important. A system for metadata that integrates external standards (as far as they are meaningful to the organization) and also local tags, such as those relating to competencies in an organization or objectives in an university program is important.

These requirements are not utopian. They are part of our own *TeleTOP* system for a number of years (http://teletop.edte.utwente.nl;). TeleTOP is not so much a "course management system" as a flexible way to make use of a database. We have, in our courses at the University of Twente, moved to universal use of the TeleTOP system, and toward an increasing amount and variety of "learning by contribution" methods. We are continually researching how to carry out these new pedagogies, what their impacts are on the instructor and learners, and how to streamline these sorts of approaches via a combination of new didactic strategies and continually improving technologies (Gervedink Nijhuis, 2000; ;Strijker, 2001; Van der Veen, J., De Boer, W. F., & Collis, B., 2000). We see these changes as both evolutionary and revolutionary. But without the technology, standardized throughout the organization and built around the "building on contributions and experiences" ideas we would be very much handicapped in moving forward.

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